The Builder.

SATURDAY, OCTOBER 8, 1853.

KNOCK often, and you will be heard at last. Whatever may have been the result of our previous endeavours to awaken attention to the circumstances under which large bodies of persons are living in London, we have the satisfaction of *knowing* that our last articles on the subject have led to positive endeavours towards improvement. We have received, too, with much gratification, the unsolicited assurance from the medical officers of several parishes, that our statements have enabled them to obtain co-operation in quarters where it had been wanting, and that they hope to be able to ameliorate the condition of several neighbourhoods. Moreover, it is stated that the New River Company has undertaken to supply water to the whole of the courts and alleys in the City on *Sundays*, as well as other days. The condition of a large number of cellars in the City, brought before the public in a recent number of our journal (p. 617, *ante*), will doubtless receive the attention it demands from the able and energetic officer of health there, Dr. Simon. And let us here take the opportunity of acknowledging the admirable conduct of the members of the medical profession generally,—conduct above all praise. The community owe them a deep debt of gratitude. If they had been listened to earlier we should be in a better condition to resist the spread of pestilence than we are. In the introductory lecture given at the London Hospital on Monday last, by Dr. Nicholas Parker, the lecturer, after tracing the history of cholera, and showing that it was now following its former track, but that its ravages had been everywhere greater, said (and was fully entitled to say it),—"We still hear men urge the impotence of our science to deal with the plague as a reproach against our profession. But no culpable neglect—no disgraceful ignorance—is ours. We cannot, indeed, stay the hand of the destroying angel—we cannot snatch his victim from the icy embraces of grim death—we cannot bid the already stagnant blood to flow onward in its course; but if the repeated warnings of members of our body had been heeded—if their reiterated exhortations and earnest remonstrances had been regarded—if their wise counsel had been followed, and the measures which they urged on the authorities of this land had been carried out, there are strong reasons for believing that cholera would not again have invaded our shores. Let us, then, remember that pestilence still rages in our densely-populated cities; that the deadly emanations from those plague spots, the burial-grounds, still saturate the air of this metropolis with their pestiferous gases; that animal, and even human putrescence, still contaminates our water; that fever still decimates our overcrowded emigrant-ships; that our poor still lodge in wretched hovels which are a disgrace to a civilised community; that lunatics are in many instances still treated as criminals; and that a comprehensive and efficient scheme of national education is still to be framed. Let us remember all these wants of the age, and not rest until the final victory be achieved."

Again we say, honour to the members of the medical profession of this country!

Touching the progress of the disease, the circumstance should not be lost sight of, that the neighbourhood of Newcastle was the first place visited by cholera in 1831; nor should the statement that at Howden, a village situated between Newcastle-upon-Tyne and Shields, Dr. Gavin and Mr. Lee have visited a house, in one room of which the first case of cholera appeared, and *proved fatal*, in 1831, in 1848, and in 1853. The increase of its virulence has been very observable at Newcastle.

Every day shows more and more strikingly that the cholera can be defeated by sanitary precautions. If houses are placed in situations where houses ought not to be, or if ill-supplied with drains, water, and proper means of ventilation, an extraordinary amount of ill-health and death results, with as much certainty as that heat comes from fire.

Let Newcastle-upon-Tyne be a "beacon" to the nations: day after day the most extraordinary statements are made respecting the sanitary condition of that town, and there is more yet to be learned. We could make revelations which would show a frightful condition of things there, but to do so would disgust our readers. An examination of the registrar's lists of deaths for two or three weeks shows of itself the connection between dirt and death.

We have almost done enough towards showing the condition of parts of London, but it may be useful to add a few notes of places through which we have walked recently. Take, for example, Gilbert-street, near the Bear-yard, Lincoln's-inn-fields. "Here," says an informant (pointing to the places), "are one, two, three, four, five—about six slaughter-houses within a few yards; a large tripe-boiler's—the effluvium from which is very bad;—stables for horses, &c. You may stand and throw a stone from one of these slaughter-houses to another. Look into this one house [we refrain from giving the number]; you see the water is coming in; there is one cask capable of holding about fifty gallons, another a little more. There is no tap in these casks, so each person is obliged to dip vessels, however dirty, into the water. This supply is for three small houses, containing five families of from five to six persons each: this number the people allow, but some of them being Irish, it is probable that they have lodgers. The people do not like to drink the water from the casks. If they can catch a little when it is coming in they take it home; if not, they go to the spring of Lincoln's-inn."

This dwelling-place has two slaughter-houses at the back, a closet close to the water, a dust-heap, and an open gully-hole in front. The smell of this place is shocking. A respectable shop-keeper opposite has never had her health since she came into the neighbourhood. In her house the water is in the cellar. Standing in this place a person pointed out a house in which two children had been ill of fever, and where one is ill of some complaint at present. At the corner a young woman is dying, and they blame the bad air. In a house on the opposite side of the street a person is lying dead—close to Bear-yard. We went at random into 4, Sheppard-street, close by. The drain is stopped: the smell, even before passing the threshold, is frightful. Within, we find a clean place, but an atmosphere of a most dangerous nature: we dive into the cellar; here is the closet, the water-cask, and but little ventilation. The effect of such conditions it is fearful to contemplate. So bad was this place that we were glad to rush out into the somewhat purer air. Any whose duty it is to inquire will receive a sad account from the people living here and round about. All the neighbourhood is in a bad state—a state dangerous under favourable circumstances, but fearful if we consider the condition and poverty of many of the inhabitants. Take one specimen—namely, the occupant of the house in which the children have been ill. The woman, who was washing, was pale and careworn, the room with its little furniture squalid and dirty; a sick child was in the cradle, over which she had watched for death several nights. She had scarcely had any food, "things are getting so dear," she said, "for such as us. I could not wash yesterday, I had neither fire nor soap. People don't know how hard poverty is: I took that poor child's clothes and pawned them for 4d.; here is the ticket: I was advised to get Port wine for the child, I got two pennyworth, there it is nearly all of it left [showing us a small bottle], the poor thing cannot take it. I bought bread with the other 2d. My other children have been ill; I have got an admission for them into the hospital. I pay 3s. a week rent for this place, but owe several weeks. The landlord, who is kind, is getting very impatient."

It must be a hard heart that can hear such a story as this unmoved. But we are not dealing with poverty or the causes of distress; and we have no great admiration for that charity which makes beggars: but these are times and circumstances when those who have means should put aside their political economy and think merely how to lessen the misery before them. Our more legitimate object and real purpose in mentioning such cases is to show that we have poverty of the intensest kind placed under the worst circumstances, and so to show the need of permanent improvements.

The supply of pure water to the poor in their own dwellings on *Sundays* and other days is a matter of paramount necessity; they should not be obliged to "hunt about" and "beg" for water. Let us hear what the people say in another quarter, namely, Middle Searle's-place.

"The people are forced to run about and beg for water; that they do; I have to do so myself, so I know. Very often the people do their cleaning on the Saturday night: it is now twenty minutes past five, and by half-past seven this evening we shall not have a drop of water." The south side of Searle's-place, which contains many houses, thickly inhabited, is "dry," as the people express it, on Sundays. On the opposite side of the way, the people are better off, the landlord having provided large and substantial water-tanks above ground, properly covered.

In the neighbourhood of Searle's-place, Clement's-lane, and the little alleys running in various directions, the filth is very great, and here fever is a constant visitor. In one court, occupied by a dealer in fancy dogs, and some other persons, there were two untrapped gully-holes; the people had complained in vain to the landlady to have these holes properly seen after, as they were nearly poisoned, and the landlady supplied them with two pieces of wood, imagining that this would be sufficient to stop the escape of the poisonous gases. In the house of the dog-dealer, some time since, the drain became stopped; a young man, the son of the occupant, at that time in perfect health, opened the drain, and in a few days he died of a raging fever! The death of the son killed the father.

The authorities in St. Pancras are active. Heaps of refuse have been removed in various quarters, and meetings have been held to consider sanitary matters. Lime-washing is going on vigorously at Agar-town; and although the measures taken are not yet adequate to the occasion, they show a praiseworthy intention. This last-named place, Agar-town, we cannot leave yet. No words would be too strong to describe the miserable condition of this disgraceful location. The houses have been *planted* here without any thought of drainage, or of any other arrangement necessary for health: it is as ill-considered as some of the *extempore* towns in the neighbourhood of the gold diggings. Fever is raging here, and, as the medical attendant of the district says, "What is the use of giving medicine when such a condition of things exists?"

Look at Cambridge-terrace. All the refuse water here remains at times on the surface, for the small pipe-drains are constantly being

THE WATER COMING IN AT AGAR-TOWN.

choaked. There are open cesspools here. After a heavy shower of rain the water floods the houses, there being no sufficient channels to convey it away. The whole of the surface of the ground is impregnated with impure matter. In the winter time, the roadways, in the centre of the streets, are many inches deep with soft mud. A few days since, at the time of our last visit, pools of stagnant water were collected here, and some black as ink, having on the surface a ghastly bloom, something like the effect produced by the mixture of coal tar with water. This water passes below the houses of the people, where it remains from year's end to year's end.

Here is Victoria Cottage, with the black, poisonous stream passing through the garden, below the boarding of the house. In this and the houses adjoining the people took up parts of their floors to show us the accumulation of filthy fluid below the beds of themselves and their children. Shall we find a churchwarden to defend this shocking state of things?

In another part of this neighbourhood, shown in the engraving, the people were anxious we should see it between four and five o'clock in the afternoon, when the water comes in. As soon as the small water-casks belonging to the houses round about became full, the overflow passed into the court and places adjoining; the water collected to a considerable depth, flowing into several of the houses, and the people were obliged to pass from place to place on stepping-stones; one man said that he had 2 feet of water in and below his room, and that snails, spiders, and other vermin were plentiful, "crawling over his clothes at night."

In one part of Agar-town, close to the wall of St. Pancras graveyard, is a water-tank sunk into the ground. We had an opportunity of looking into it, and found it to be built only in the ordinary way with bricks.

Notwithstanding the daily overflow and collection of water, the people in Agar-town are "dry" on Sundays. Can it be necessary to say anything more to show how much interference is needed in this miserable district?

The churchwardens of St. Giles's-in-the-Fields, Messrs. C. R. Rowland and T. Hunt, have taken upon themselves to state in the *Times*, that the account which we gave in a recent article (*ante*, p. 601), to the effect that a cry of fire being raised in the Coal-yard, Drury-lane, one of the persons living near complained of neglected condition, and thanked God there was a fire, as she would then get some water—is "very inaccurate;" and they go on to prove this by asserting that "the spot in question happens to be better supplied with good water than perhaps any locality in London," and that there are "within 20 yards of this very house no fewer than six public pumps of excellent water, five of which are in good working condition,"—logic which would entitle them, if the matter were less serious, to be reckoned among the useful machines to which they allude. It can scarcely be necessary to say that the account is strictly and literally accurate; there was no water at the time in the receptacle, it did begin to run into it when preparation was made for the fire, and the expression, feelingly uttered, was heard by several persons. The inference drawn in *The Builder*—namely, that the inhabitants must be ill supplied with water when they thank God for a fire—might have been questioned by Messrs. Rowland and Hunt: their denial of the accuracy of the account is wholly unjustifiable. But what will be thought when we say that of these six "public pumps," thus vaunted of by the churchwardens, two are within the enclosed premises of the almshouses adjoining, one is in an ironfoundry (where, as they told us on the spot, the neighbours have no business whatever), the fourth is altogether out of use (not to be called a pump), and the fifth is in a neighbouring court. There is one small broken pump at the back of the house, to which our statement referred, communicating, not with an ever-gushing spring of pure water, as the churchwardens' letter would make people suppose, but with an underground tank in most doubtful position, and which has not been cleaned out, if one of the inhabitants is to be believed, for these last ten years.

Whether it was water to make clean with or water to drink for which the woman was so anxious that she thought a supply of it cheaply purchased by the conflagration of a house or two, we need not now inquire. Messrs. Rowland and Hunt evidently think that water cannot be wanted by the poor for any purpose but the latter.

The miserable condition of the filthy place in which this pump stands—called King's Arms-yard—is but feebly set forth in the statements we have published. Here about a dozen residences, in a sort of gallery formed over stables, are ranged around what has been one immense rotting dung-heap. We say "has been," because some efforts are now being made to improve its condition. When we last went there men were carting out of it a mass of decomposed filth, the smell of which was scarcely endurable, and "not before it was needed," said one of them, with a shake of the head, which seemed to mean a sort of apology for our journal. Close to this spot, the approach to which from Drury-lane has now, appropriately enough, a coffin-maker's shop on each side, the great plague of 1665 broke out, and here up to this moment of writing, neglect, ignorance, and *laissez faire* prepare the way for a fresh pestilence. Most deeply is it to be regretted that at such a time as the present men should be found to lend the weight of an official position to obstruct endeavours to obtain improvement in the neglected portions of this two-sided metropolis, instead of giving their earnest aid, as they should do, in furtherance of them. The officers of St. Giles's-in-the-Fields do not

come before the public with clean hands. When the shameless proceedings at their graveyard in St. Pancras-road were set forth in the journal they now seek to discredit, it excited a burst of indignation which they would gladly have lessened by denial. This, however, they found was impossible, and they were forced to retain the opprobrium. Messrs. Rowland and Hunt make patronising mention of "our voluntary nuisance-seekers," which sounds much like a scoff. Let us tell those gentlemen that investigations into the condition of the neglected dwellings of the London poor will not usually be pursued as a matter of liking; it is too distressing and laborious a work for that, and we had hoped that the time was gone by when painful labourers in this sad field were repaid with a taunt. The effect of an examination of an abominable neighbourhood now being cleared in the vicinity of Portman-street was so prostrating as to induce a series of fainting-fits a few days ago in an otherwise strong man.

It is to be feared that we are approaching a time of trouble, and we would most earnestly implore all who have the power to aid in obtaining for the poor the advantage of a plentiful supply of water, good drainage, and room to breathe in. We feel entitled to speak, because we have seen, and only those who do see can have a just idea of the frightful hotbeds of disease and death with which London is spotted.

THE ARCHITECT'S RESPONSIBILITIES.

It is no new or much-disputed doctrine that the boasted stronghold of British liberty, the wisdom of a jury, is much more of a mythical tradition than a practical fact; but it is rarely indeed that a subject so entirely beyond the comprehension of the haphazard twelve has been so unhesitatingly tackled and so uncompromisingly adjudicated upon as in the case of the Strand accident the other day; and it really seems high time that some modern modification should be devised for this antiquated system, whereby the most complicated questions of technical responsibility and scientific skill are referred to the irresponsible decision of a dozen shopkeepers, selected, as I am told, by the beadle of the parish, at his will, from among the number of those who have neglected to oil the "parochial" palm with the customary *douceur* for exemption.

No doubt Mr. Abraham brought the preposterous, but most annoying, verdict upon himself by the ill-advised anxiety he displayed to show that he had taken great pains with the business; and it is no wonder that, with such materials as a coroner's jury is usually composed of, he found himself at last in the position of having proved too much, and thus proved his own error. In the next step of this unfortunate affair it is to be hoped that he will take a widely different course.

But be this as it may, there is no doubt that we architects must now clearly perceive ourselves to be by coroners' law subject to very serious responsibilities, unless we take this occasion promptly and energetically to pronounce what responsibilities we recognise ourselves to undertake and what we do not. This verdict will become a most dangerous precedent if allowed to pass unchallenged. Once established as a principle, it will become a matter of form to hold the architect liable for every accident that happens; and we know not which of us may be the next, and how speedily it may be, to stand upon his defence, almost for his life, in a question of scientific argument before a parcel of men who know no more of algebra than that it is, perhaps, something to eat, or of Euclid, than that he may have been a Caffre chief, or may have been a Dutchman.

I will venture to uphold the broad principle that the architect, in his proper capacity (beyond which he ought never to travel), is not in any case responsible for damage either to property or to person, arising out of the operations of the builder, but that the builder is wholly responsible for everything of the sort. And this ought to be the more particularly urged at the present time, when builders are ceasing to be practical workmen, and becoming no more than mere capitalists and speculators,—simply *contractors* in fact, as they are very properly called. In the present instance it is worthy of remark that the architect testifies to his having never seen either of the contractors, Messrs. Lucas, upon the premises on any occasion, from first to last. Most of us will agree that Mr. Abraham acted very unwisely in suffering his work to be done in such a way.

The scientific functions of the architect I hold to be these,—To devise the entire design of the structure; to transmit it, with proper explanations and directions, to the builder; and, relying upon him as a person practically competent to perform the work in every respect properly (for without this what are the builder's functions?), to make occasional inspection of its progress, with respect to nothing more than its being performed in strict fulfilment of the contract. He repudiates all possible liability in respect of damage to neighbouring property, by specially stipulating in his specification that the builder shall take that responsibility upon himself; and if he do not specifically provide that the builder shall be similarly responsible for the safety of his operations in respect of life and limb, it is because he never dreams of any one but the builder being held responsible for a matter so peculiarly his own act, involved in the mere mode of his performing his work. Moreover, there are not wanting builders to maintain and architects to admit, that as every man knows his own business best, so the builder is, or ought to be, a better mere *builder* than the architect can be; and certainly a responsible and experienced builder would be justified in treating any interference on the part of the architect with such a thing as scaffolding or shoring as a pragmatical impertinence, except in a case where such a matter may constitute an important scientific problem, specially devised, as in the case of the centering of a bridge or the framed scaffolding for some extraordinary operation. In other words, I may say that the architect is not responsible for any operative detail which he has not specifically designed, represented by drawings, and described minutely in the specification; nor for anything which the builder does merely for his own purposes. And accordingly his supervision of a work is of a nature to correspond: it is such a control as he may exercise, no matter what the distance may be: it is no position of every-day direction to the workmen,—that is the province of the builder: it is no more than an occasional examination of the work during progress, to correct any misinterpretation of his design, or check any imposition which may be attempted upon him. If Mr. Abraham (supposing him to have kept within his proper province) be responsible for the manner in which Messrs. Lucas shored up the old wall, or the manner in which they undermined its foundation, he must be equally responsible for the manner in which they might build their scaffold or load it, or raise the roof, or fix a ladder, or run up a block of stone with a pulley; and if the work had been at a distance of 500 miles instead of a street or two, and he had never seen it at all, his responsibility must have been the same. I do not mean to say that the architect had no right to see to the shoring and underpinning: on the contrary, I admit that it would be his duty to point out anything which he might casually perceive to be in error; but he ought to have carefully avoided taking upon himself any appearance of responsibility in respect of the operations of the builder for his own purposes: in other words, he ought to have kept strictly within the province of occasional inspection, and to have left to the builder all responsibility connected with every-day supervision. In one word, the architect, as the agent of the "building owner" (his only capacity in the business), assumes all responsibility attached to the design of the construction; but the builder, as the practical contractor for the work, takes all risk attached to his manner of carrying it out; and if Mr. Abraham took charge of the details of shoring and underpinning an old wall, he stepped beyond his province as architect, took the place of the builders, and got thrown by them into the liability as a return. If Messrs. Lucas were not competent to take personal responsibility in such a matter, it was the architect's duty—not to relieve them at his own expense, but authoritatively to warn them of their risk; and if it be the case that the employment of so many counsel in this case is to be taken as the result of a resolution manifested by the contractors to evade their just liability as tradesmen, and let the loss fall on whom it might (for I presume it is not the crime of manslaughter, but the pecuniary damage, which is the *gravamen* of the matter), then it behoves architects to be very careful as to whom they commit themselves with as builders, if there are some who honourably acknowledge their obligations, and some who do not. If Mr. Abraham were a young man beginning life, this misfortune would, in all probability, have utterly ruined him.

The architect *volunteered* his evidence: Messrs. Lucas were otherwise and better advised. It is Messrs. Lucas who ought to have volunteered evidence, and exonerated the architect, if necessary. Their pleading was as plain as possible. "We are the legally responsible parties: that we were not criminally culpable we prove by evidence that our foreman in charge was a very experienced man: that his error was mere human fallibility, we prove by his own death as the result, although were he more seriously to blame he is now beyond your censure: we acknowledge the assistance of the architect to the fullest extent compatible with his professional duties, but notwithstanding all, we have to deplore the sad result, and as honest tradesmen taking a profit for a risk, we must bear the pecuniary loss."

To prevent all mistake in future on the part of coroners' juries, I am inclined to recommend that our specifications should not only provide that the contractor shall bear all responsibility of damage to adjoining properties, but also specifically, that in all cases he shall take all risk of injury to life or limb arising out of his performance of the work. Such a clause in Mr. Abraham's specification would have put the saddle on the right horse at once; but we live and learn. R. K.

THE CLOCK FACE PROBLEM.

The query about the clock at Havre with a dark dial and illuminated hands, suggests to me that it is time some symptom of "progress" reached that venerable symbol the dial. For at least a century past, from St. Paul's campanile down to the "horizontal lever," face answereth to face. Surely what is repeated so many thousand times a year must be something very perfect, a very paragon of sense and taste, if it be true that "practice makes perfect, or, in other words, that doing a thing *often* leads towards doing it *right*.

Well, let us see. Here is a sort of semaphore of two arms, a thick and a thin arm, whose combined positions alone, without other marks to guide us, will express, without ambiguity, twelve times as many things as we can distinguish positions of the longer arm; and I believe the most inexact eye can distinguish twenty-four of these. We have, then, a character of *two strokes* capable of so varying as to express *two hundred and eighty-eight* meanings, which, I believe, quite out-shortens all stenographic inventions, and would furnish telegraphs a hint for considerable economy of time (*i.e.* of wires, for time is copper in this case), to say nothing of John Chinaman's future dealings with those *impedimenta*, his real oppressors, the 30,000 ideagraphs, tougher than Tartars. So far, the two hands revolving on one centre, and the convenient period of each, are vestiges of a deeply-considered and sterling design.

But we want, for ordinary purposes, to distinguish twice and a half the above number, viz. 720 periods in the half day. That is the most that any *public* clocks, I believe, attempt or profess; and it requires such further aid as may enable the eye to separate sixty positions of the thin hand, though twelve still suffice for the thick. Now the most inexact eye discriminates without hesitation *five* divisions in a given space, so as to tell whether an index has advanced one, two, three, or four fifths of the way from one mark to another. Therefore *twelve points* round the dial are amply sufficient to mark the sixty positions of the thin hand, as well as to fix perfectly the twelve of the thick one, which (though quite distinct when it is alone)

might tend to be confounded in the eye by the interference of the other index.

Now the distance at which you can read such a character must, any one can see, be just proportioned to the length of the hands (always supposing their effective width proportioned thereto), and the usefulness of a clock is as the area over which it can be read; *i.e.* as the square of the greatest distance you can read it at; in other words, as the square of the hands' length (the *shortest* hand's, if they are of different lengths), or the area of the circle the hand describes. Where is the reason, then, in occupying at least half your available space (half the *radius*, or *three-fourths* of the space in one familiar face—I think that of St. Mary-le-Bow) with a set of clumsy hieroglyphics, elongated, like a marine-store-dealer's alphabet, to the very limit of legibility, partly inverted, *never read*, and whose positions every one knows, because, if they did not, it would take a serious study to decipher them as they stand? But to make room for these, our venerable symbol has its effective strokes shortened about one-half, for the additional length of the minute beyond the hour hand is of no effect whatever but to confuse the figures more. Thus the utility of the clock, the area over which it is legible, is reduced to about *one-quarter* of what its size naturally admits,—nay, one-quarter of what it would be if it were *all hands*, without the twelve fixed marks, which we have seen the eye requires for moderate exactness, but which yet are more than it can get from the present dial, unless near enough to see the details of the outer graduated circle; for our elegant hieroglyphs are far too large to be of any service as marks.

But the climax of absurdity is our illuminated clock, retaining all this in black on a luminous ground, which, the brighter it is, the more it encroaches upon, and, to the naked eye, *eats up* its markings like the sun his spots, by irradiation on the retina. Advertisement-printers and sign-painters have discovered, well nigh ever since those arts became profitable (before the now defunct "tax on knowledge," *alias* lie-tax, began its wholesome but infinitesimal operation), what proportions in the parts of the Roman letters would enable them to be read at the greatest distance, and how much thicker their strokes required to be when the ground greatly exceeds them in brightness, or how much thinner when themselves bright on a dark ground. But all this has never reached the stagnation of borometrical art; so the luminaries that we set in the firmament of Portland or Kentish rag, to rule the seasons of the night, however far the architect may permit them to shine, for at least nine-tenths of that range, or ninety-nine hundredths of the areal space they pretend to benefit, mock the inquirer with a round unmeaning disc of fire, like the moon without the man in her. Such an arrangement as your querist saw at Havre would be intelligible almost as far as visible, certainly several times farther than our "*negative*" (as the photographers would say) *fac simile* of it. But remove its twelve useless hieroglyphs, that at a distance would only make a muddle of the whole, and the positions of the hands will be seen still farther. Instead of removing the figures, reduce them small enough to serve as *dots* (for I suppose there is a talismanic necessity for their shapes, whether visible or not), and it will be intelligible to single minutes fully as far as these dots are visible, and this though contained in little more space than the plain part of the present dial. Enlarge this, then, to the diameter of the original dial, and you about treble the area of its usefulness once more; how many times altogether beyond that of our ridiculous manless moon, I will not venture to reckon.

So, having made out, I conceive, a clear case of stagnation against the dial-makers, and of utility in this problem, let us proceed to your querist's mechanical difficulty. Substitute for the hands two transparent or perforated discs (they need not at all approach the weight of glass ones), each divided into many (say twenty) concentric ring spaces of equal width, alternately opaque and transparent (or pierced), but so that all those which are opaque in one disc, shall be transparent or open in the other. Remove as much of each opaque ring as shall leave the proposed form of a hand in each disc; all transparent or open. The two together will then stop all light, except in these forms of hands, which will each appear composed of transverse bars, alternately light and dark, as numerous as you please. When they overlap, the overlapping part being doubly luminous, will preserve the outlines of *both* complete, the want of which in every other possible construction of hands, is no small source of confusion when overlapping. At a distance too great to distinguish the separate bars, the hands as well as the overlap will appear *uniformly* luminous, though only half as bright; and this effect, if preferred, may be retained at all distances by simply bringing the ground-glass dial from behind to *before* the moving discs, whose bars or rings must, in section, be triangular, with edges forward and backward, and their flat sides together, as near contact as may be.

G.

P.S. The method described by Mr. Bennet doubtless supersedes that suggested by me for managing the luminous hands, as the moving parts are much lighter. Still, however, both are equally open to the objection of enormous waste of light, as enough must be manufactured to give the whole dial that degree of illumination which the hands really have. Of a beam filling the whole dial, all that is not intercepted by the hands is, in my plan, stopped by the opaque parts, and in his, sent up to the sky. I would submit to him, therefore, whether it would not be better than either, in large clocks like that at Westminster, for hollow hands, with fronts of opal glass, to carry the burners in their own interior, the gas being admitted into their axles as steam into an oscillating engine, and ignited by electricity, and the products escaping and air entering all round the edges of the hand. My argument for dispensing with the figures remains untouched, and I contend that they should always be replaced by twelve *naked* flames, no larger than to be just visible as far off as the eye can separate one from the next. If there be also jets for the sixty minutes, they should be a distinct circle *within* this. To make largest that which is for the nearest readers seems absurd, and they must not be in the *same* circle with the twelve, or all will tend to blend into a continuous ring. A contrast of colour in the two hands would be an assistance; the minute-hand *red*, which is visible farthest, and the hour-hand *green*; but not too much colour in either,—not much more than in a double star. Besides this, the thinness of the minute-hand should be compensated by brightness, equal quantities of gas being burnt in each.

G.

SCRATCHES ON THE ROAD.

PESTH, VIENNA, AND THE "CAMP."*

In order to see Pesth, I started on board the steamboat and proceeded down the Danube, but the voyage for about ten hours was the most uninteresting possible. I learned from a fellow traveller that it was a good specimen of the Ganges, so I learnt something by illustration. The only river that I know like it is the worst part of the Scheldt; but my national pride was flattered when I thought that speeding over this dreary part of this gigantic river was the result of English enterprise; and I enjoyed the companionship of a gentleman who was going to Pesth to mark the progress of vessels that he is building there; nor was my pride diminished when I was addressed the next day by an Englishman, who was the superintendent of the works, wearing the royal uniform of this country. At Gran, about forty miles from Pesth, the river assumes quite a different character, very much like that of the Rhine. There is nothing interesting, except for its political circumstances, in Pesth: it seems a busy, active sort of a place, containing some very good buildings on the quay; those destroyed at the time of the revolution being rebuilt. The great lion of the place is the suspension bridge, built by our countryman Tierney Clarke; and a magnificent structure it is. You, of course, know the proportions, so it is not worth repeating them. I went to see the fortress which was the subject of such fierce contention in 1849: it is now restored to its original state, and in the centre of the square has been erected a monument to General Hentzi and the 418 brave fellows who then fell for "*Kaiser und Vaterland*." The former will be admitted, but the latter part of the proposition will be disputed, at least by many in London. It consists of a simple Gothic pinnacle of bronze, under the canopy of which is a figure of a fallen knight, and above him a figure of Fame, both gilt. On the sides are the names of the 418. The great marvel and subject of every one's conversation was the discovery of the Hungarian regalia, which had been taken away by Kossuth. Of course you have heard of this and all the particulars, but the story, as told me here was, that an old man was dying, and he sent for a priest to perform the last offices of the church, who, upon hearing that he had something political to communicate, sent for the "*Reichshaupman*," or military governor, who arrived just in time to hear the old man say "the Hungarian crown, it is here," and then he died. The governor commenced a search, and the regalia were found buried near the spot where the old man breathed his last. There is to be a grand *fête* on Thursday at Pesth, when they are to be deposited in their usual place. There may be a question of the policy of making this demonstration amidst the discontent that prevails there.

The most splendid thing in Vienna of modern production is Prince Lechtenstein's palace. It has been fitted up by an English architect, Mr. Desvignes, in the most gorgeous style, at a cost of 60,000*l*. The entrance is by a hall and well-proportioned staircase of white sandstone, which has an appearance of coarseness, especially when the beautiful marbles that adorn the apartments are seen. You pass through three reception-rooms of excellent proportion, but simply decorated with white and gold and with amber furniture. These introduce you to the private and state rooms, which are as rich as marbles and gildings can make them. In the ball-room is an effective and valuable contrivance, which consists of three large doors, each turning on a centre-pin, and at the back of these is a large plate of looking-glass; so that when the doors are reversed, the reflection increases the size of the room, and extends its brilliance.

The covering of the walls consists of the same silk as that of the furniture: it is very rich in its character, and must be a great trial to the ladies' dresses. The parquets are of exquisite pattern and workmanship, and tend to the completion of what, as far as my experience goes, is the richest specimen of domestic decoration to be found here.

The Viennese appear to be a people much cramped in their mind, and display that want of energy which is shown by a boy who has had too much parental control, and whose tastes and opinions have never been allowed to develop from their own force. An immense amount of discontent prevails, and I have been astonished with the warmth of the expressions used against the present state of things. Everything is very dear. The people are enormously taxed: a royal decree has just been issued, enacting an additional land-tax of 10 per cent. and withal a paper currency, without any control to its issue, or security for its conversion. Every person is obliged to carry a pocket-book in which to keep his notes, as from the smallness of the amounts for which they are issued and the poverty of the government, they are made of such flimsy material that they would soon wear out in the circulation. I have preserved two, in the last stage of decay, of ten kreutzers each (fourpence), to present, on my return to England, to a friend of mine who was an eloquent advocate on the side of the Anti-gold League; and with them I propose to give him a few statistics, that I hope will induce him to hope as I do, that the time may never come when those mysterious old gentlemen with the quaint signatures may promise to pay to Mr. Matthew Marshall such small sums as those above mentioned. By the way, I perceive that these same signatures are now printed with the notes. I hope this does not arise from these gentlemen getting tired of making promises that are so easily fulfilled.

The Prater is much larger, bnt has the nearest resemblance to Hyde Park and Kensington Gardens I have met with on the continent. In the retired parts of it are deer and game, and this will give an idea of what a quiet retreat this must afford in a great city. I went to the Opera several times. There is a new tenor singer of the name of Steger, who is much estimated by the Viennese. Lanner and Strauss are

* See pp. 570, 592, and 616.

no more, but their sons continue to preside over their bands, which are to be heard either in the Volks-garten, or at some of the drinking and smoking houses almost every night; where their strains enliven and perhaps prevent the minds of the visitors lapsing into that lethargy which an absence of intellectual occupation must produce; the excessive smoking, to which they are the most abject slaves that ever were witnessed, must entail that enervation which prevents the ordinary illustration of character being anything but that of disregard for anything else than their own indulgence. I paid a visit to the royal stables, that are under the direction of an Englishman of the name of Brough; our countrymen are very much sought after on the continent to fill this post. The stables contain about 450 horses, which for a portion of an establishment is moderate in a country where they are reduced to give an unguaranteed note for fourpence.

I was not particularly struck with the public monuments, but there is a circumstance about them which I should be glad to see adopted in London—that is, the bases, plinths, and additions are made of polished granite. On that of the Emperor Joseph II. in addition to this there are four corner circular columns, to which are attached bronze medallions; and on that of the Emperor Francis is a fanciful bronze moulding, which contrasts very well with the granite, and gives it a very agreeable finish. There is a miniature copy of the statue of Joseph to be found in the grounds at Schönbrun, which is more pleasing than the original, as it appears to possess more life and vigour; and the near hind leg of the horse is free, while that of the large one is supported by an attached block.

My attention has been called by an Austrian to a letter in the *Times*, signed "A Scotchman," in which the writer vindicates the authorities from the charges of annoyance. There is no doubt that the government have relaxed a great many of the most rigid regulations—such as personal attendance at the police office—but still it is not so free from vexation either to Englishmen or natives; and the consequence is, that I have several times heard the "Scotchman" denounced as an Austrian spy, and those who thus accused him were without doubt sincere in their belief.

From Vienna I went to Olmütz, distant about 130 miles, to see the camp of 50,000 men there formed. It was on the same day as that on which the emperor was announced to arrive, and being some two or three hours in advance of him, I had a good opportunity of observing the preparations that had been made for his reception. You have sometimes written about decorations and pageants, and you would have been amused to see the way in which the inhabitants had improvised the ornamentation of the town in honour of the kaiser. Nearly every house had taken down the curtains, poles, and cornices, and suspended them from under the window-sill: thus you saw red, green, and blue moreen, and in some cases dimity, festooned with muslin and cords; in fact, showing that the arrival of his Imperial Majesty had partially caused his liege subjects "to turn their houses out of window" for an ovation. There were two columns of glazed calico, fluted white and red—the colours of Moravia—encircled by some evergreens, and some black and yellow flags, the colours of Austria Proper, of the same material as the columns, and this was all beyond the curious domestic display just mentioned.

His Majesty was to lodge in the palace, which is in a square called the Bishof Platz, and here I found a company of infantry with their band, and a number of staff officers. About an hour and a half after he was expected, there was a stir among the soldiers, who "presented arms," and the band commenced playing the National Anthem, and his Majesty entered the square in a carriage and pair, in a way that convinced me that he had been closely studying Bourienne. There was the ghost of a cheer, which was a feeble contrast to the unanimous shout of welcome that I recollect to have heard on a bright and glorious day at Chobham; but then that was given by voices that are not kept in subjection by 400,000 swords and bayonets.

Instead of going into the palace at once, he descended from the carriage and walked in front of the line, and called out in a loud voice "*Lassen sie schuldern*," "Let them shoulder arms:" this order being obeyed, he shook hands with the officers, a little to the astonishment of the captain, as it appeared to me, and bowed to the drum-major, who was literally "bearded like the pard," and who seemed quite overwhelmed with the condescension. Then, having walked about for some time, he entered the palace. I have not seen so great a histrionic display since I saw that renowned comedian, Mr. Gomersal, perform the part of *Napoleon* at Astley's, in the annual piece, the "Battle of Waterloo." I remember well his entry after the same fashion, and after taking a pinch of snuff, which was a great point in his interpretation of the *rôle*, as the critics would say, he was wont to exclaim, "Let my brave fellows repose."

In the evening there was a grand illumination, with which I was much struck for its uniformity and unanimity, every window seeming to contain the like number of candles, and which I could not understand, as I thought there must be some discontented or perverse spirits who would not be inclined to "light up." On expressing my surprise at this, I was told that the police give a gentle hint to the inhabitants of what would be required of them on such an occasion; "and, moreover," added my informant, "the K. K. Apollo Company (like Price's Patent Composition) is an *imperial spec.* which must be benefited by the consumption of so many candles at forty-eight kreutzers the half-dozen."

Two bands paraded the streets, and one performed before the palace the whole of the evening, and perhaps when the Emperor gazed from his window and saw the lights and heard the buz of the many voices, he fancied he reigned over a happy people.

In the morning, about half-past five, I was awoke by the band of a regiment which was marching in front of the hotel. This was a signal for me to rise, as the camp operations were to commence at seven. The encampment is made about a mile from the town on an extensive plain, with scarcely any undulation for between ten and twenty miles, at which distance rise some pretty mountains, giving a good background to the view.

By the kindness of the young Count Herberstein, who is a lieutenant in a regiment of Lancers, I was enabled to look at the arrangements. All the horses were picketed—not in stables, as with us. The only objection to this, the Count told us, was, that in the night the horses got loose, and they had lost several from the injuries they had received. The horses were of every variety of colour, although there are some regiments where there is an approximation to one. The men were lodged in small tents formed of two uprights and a cross-beam, over which was thrown the canvas, open at one end. They certainly did not appear to my eye half so large as those used for our own men, but they were made to accommodate eight. Some of the infantry regiments had larger circular tents, which were made with the top canvas projecting over the sides, forming a good-sized eave, under which was dug a trench for a drain. These were intended for thirty-three men, and they appeared to afford much more comfort than the small ones; but whether the greater difficulty in "pitching and striking" these render them less available for the purposes of war, I must leave those who are competent to decide.

The kitchens were all built of brick, the ground sunk about a foot for the fire, the opening to which was at one end, and at the other was the chimney. They were about 6 feet long and from 3 to 4 feet broad. At the top were holes, into which were placed the pots, which seemed to fit quite tight. As there seemed to be nothing cooking but a "*pot pourri*," this sort of apparatus might do very well; but with our men who cook in a different manner, it would, perhaps, not be quite so convenient.

I was most struck with the dilapidated condition of the various trappings and the seedy-looking appearance of the men, a sight that would fill Lord C.—of whom it is said, that he is never happy without he is up to his eyes in pipe-clay and buckles—with the most intense horror. Then the indolence of the soldiers appeared to me so remarkable. All the cavalry have leather round the bottoms of their trowsers for their preservation; and I saw one man in the act of brushing these, which he did after this fashion: he put his foot on a stool: with his left hand he held his pipe, which he continued to smoke, and with his right he slowly and mildly attempted to polish his extremities with an implement little larger than a toothbrush. The infantry were dressed in their fatigue-jackets, which are made of something akin to sacking, and among these the *chaussures* were in a most pitiable plight; but I suppose, with all the inefficiency in the way of attire and accommodation, they would kill with an alacrity quite equal to the best clad and the most sprightly looking.

The camp seemed to excite little attention, as there could not have been more than a hundred people altogether to witness the proceedings, but I expect that the number would be very great when the Emperor of Russia was present. Whether it was owing to our being foreigners, or that our costume was better than the rest of the spectators I do not know, but the police certainly showed us great favour, and allowed us to approach much nearer than others, whom they drove back in the most surly tone.

The Emperor arrived about half-past seven. There was a rostrum erected in the centre of the field, which he ascended, and after taking a general survey with a glass, he mounted his horse, and the infantry were put through certain evolutions, and ultimately brought to a wood, from which, I presume, they were attempting to dislodge a supposed enemy. While busied about this the Emperor left them, and returned to his tent, for the purpose, like a true Austrian, of having a smoke. Having finished his cigar, he again mounted, and proceeded to the heavy cavalry, which he led by a variety of movements to aid the infantry. Whether he "got out of the wood" I cannot say, as from the distance these manœuvres occupied, and the telescope I had not being a very good one, my eyes got tired with straining, so I returned to the town to pack up and start in pursuit—which is more to my taste—of those arts which, though justly brought to the honour of heroes, are much more distinguished in the illustration and adornment of peace.

F. S. A.

BUILDERS' BENEVOLENT INSTITUTION.

THE sixth anniversary dinner at the London Tavern is drawing near, and we are glad to see a goodly list of stewards. The day appointed is Tuesday, 25th inst. Mr. Rolt, M.P. will be in the chair, and it is to be hoped that both the trade and the profession will rally round him.

LAMBETH BATHS AND WASHHOUSES.

WE this week present a plan of this establishment, alluded to in a previous number (p. 440, *ante*) on the occasion of the opening of the great swimming-baths. A large proportion of the slipper-baths have since been completed, including those arranged in the galleries shown in the view of the interior of first-class swimming-bath.

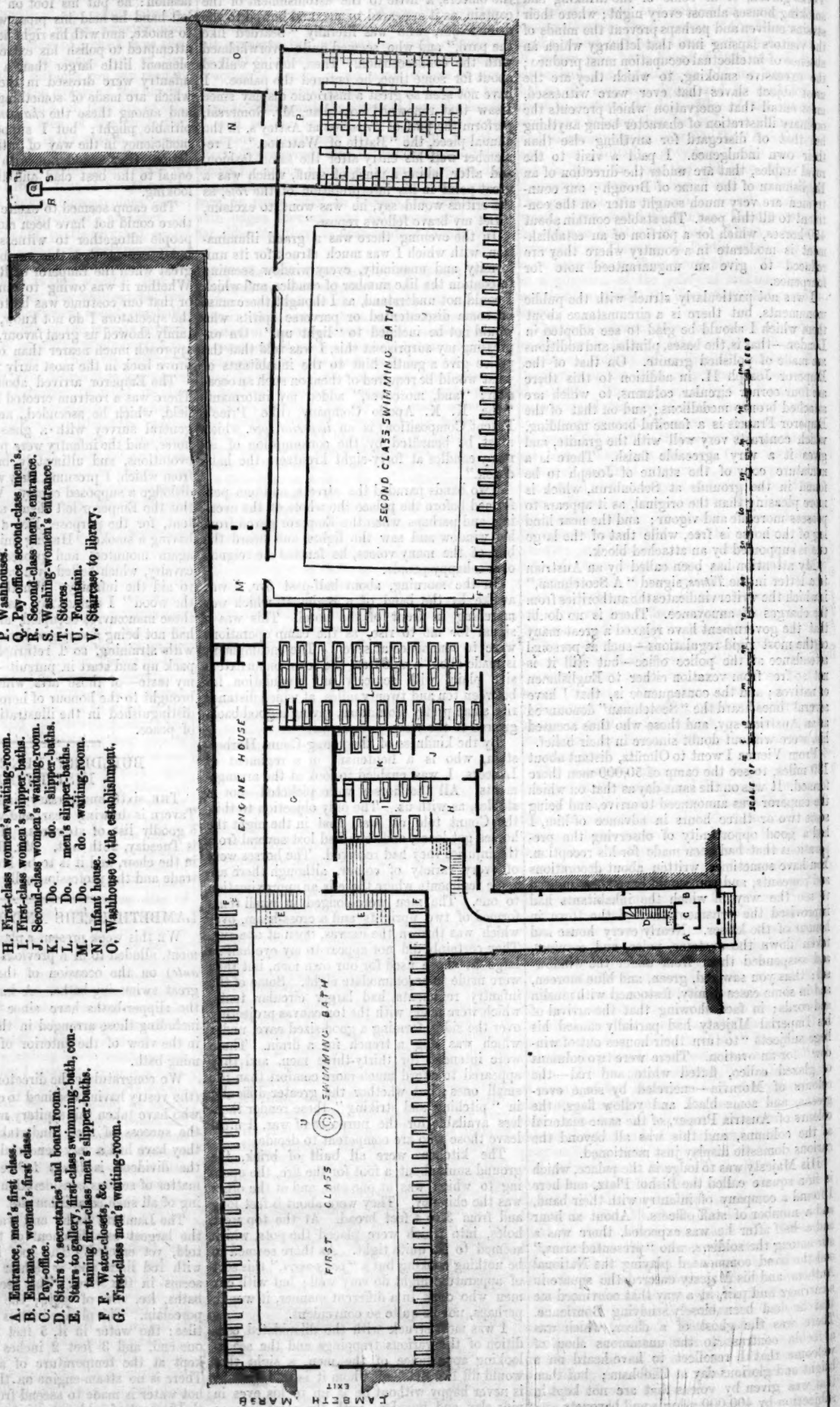
We congratulate the directors of the company (the vestry having declined to carry out the Act), who have taken this sanitary matter in hand, on the success of their undertaking, as we learn they have had a very beneficial season, and that the dividend is likely to be satisfactory,—a matter of serious consideration in the well-working of all such establishments.

The Lambeth baths and washhouses will be the largest establishment of the kind, we are told, yet erected. The roof is painted white, with red lines, and is lighter in effect than it seems in the view. The steps, enclosure of baths, &c. are of slate; the slipper-baths of porcelain. The plunge-bath is lined with white tiles: the water in it, 5 feet 2 inches deep at one end, and 3 feet 2 inches at the other, is kept at the temperature of about 74 degrees. There is no steam-engine on the premises: the hot water is made to ascend from the boilers by the descent of cold water into them from tanks above.

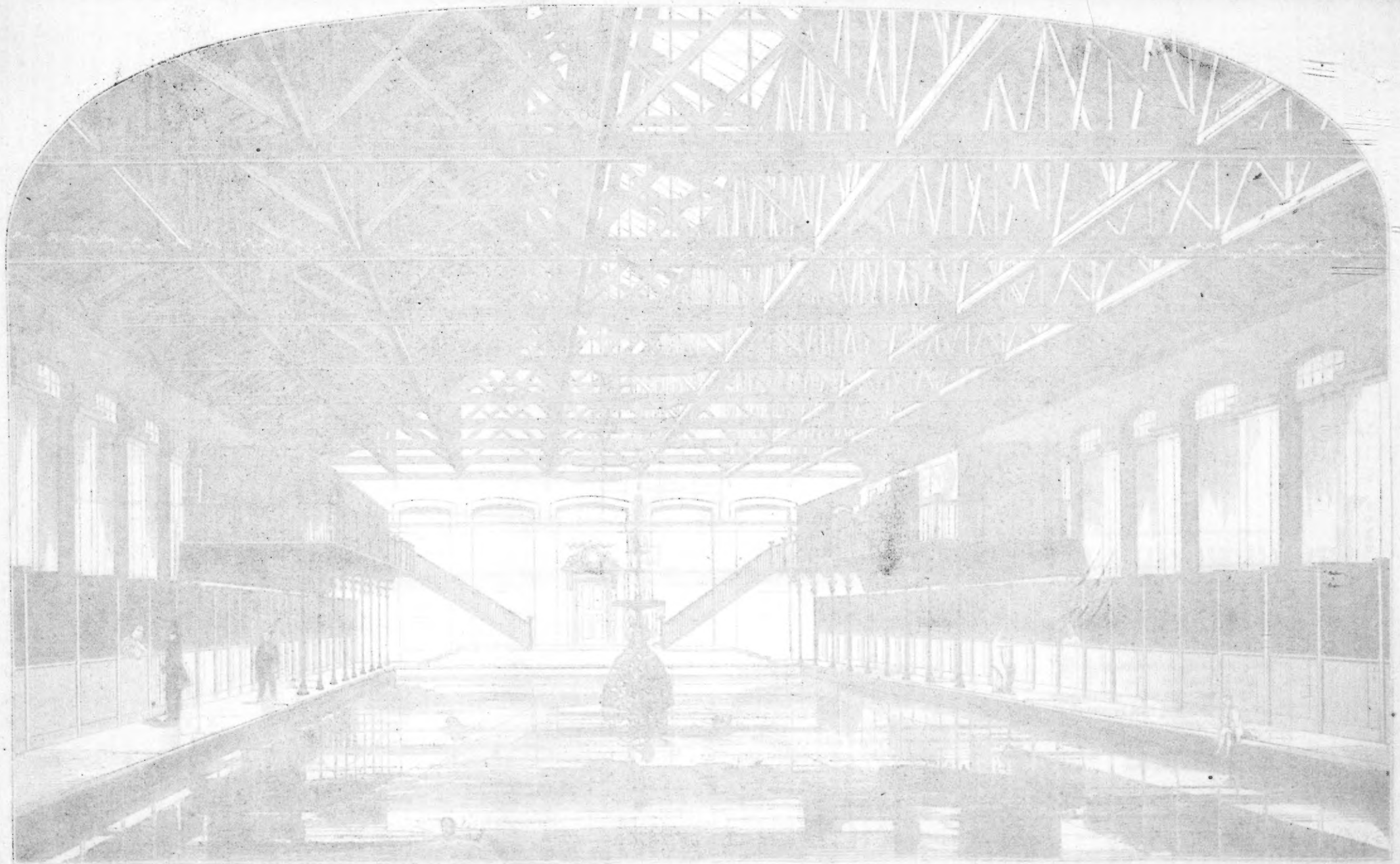
The whole works have been constructed under the direction of Messrs. Ashpitel and Whichcord.

PLAN OF THE LAMBETH BATHS AND WASHHOUSES.

A. Entrance, men's first class.
B. Entrance, women's first class.
C. Pay-office.
D. Stairs to secretaries' and board room.
E. Stairs to gallery, first-class swimming-bath, containing first-class men's slipper-baths.
F F. Water-closets, &c.
G. First-class men's waiting-room.
H. First-class women's waiting-room.
I. First-class women's slipper-baths.
J. Second-class women's waiting-room.
K. Do. slipper-baths.
L. Do. men's slipper-baths.
M. Do. waiting-room.
N. Infant house.
O. Washhouse to the establishment.
P. Washhouses.
Q. Pay-office second-class men's.
R. Second-class men's entrance.
S. Washing-women's entrance.
T. Stores.
U. Fountain.
V. Staircase to library.



THE LAMBETH BATHS.—Messrs. Ashpitel and Whichcord, Architects.



THE LAMBETH BATHS.—Messrs. Adeane and Wilkinson, Architects.

COLUMN AT AMMERDOWN PARK, SOMERSETSHIRE.

FULLY to explain this structure would require considerable space and illustrations, and it must be completed first. Until then it would not be in a proper state for inspection, even by those who can best comprehend the principles applied, as necessary parts are left unfinished, or covered up for protection, during the progress of the works.

The ground on which this memorial is placed is supposed to be nearly 800 feet above the level of the sea. The highest point of "Mendip" (six miles off), according to the "Ordnance Survey," being 999 feet. The total altitude of the pillar will be about 130 feet; and the number of steps to reach the floor on the top will, perhaps, exceed 170.

The design may be described as having three principal divisions, viz. the pedestal, the column, and the crystal-crowned enclosure, for a "*panoramicon*," where a company, protected from accident and weather, may at leisure prolong the inspection of an extensive view of an interesting, a rich, and undulating surrounding country.

In making the design, the first considerations were the requirements; the second, substantial construction, according to the materials procurable; and the third, the application of scientific forms of lines and surfaces derived from the inexhaustible source, practical geometry,* the storehouse of the ancient Greeks, for the elements of art, every line of grace, truth, and beauty, having its eternal law. Before a line can be applied it must be known.

A few lines give the general contour and individuality of this building, such that their forms may be seen from a distance, having been chosen; but ornament deduced from the same source, or directed by the same guiding principles, may be added to a great extent. As soon as the design was determined, a drawing-board, more than 100 feet long and 6 feet wide, was made; and on that was described full size, and with the utmost accuracy, the curves to be introduced; and to these zinc moulds and radial rods were prepared before the work commenced. In the foundation there are about 1,000 tons of concrete and stonework; and 1,000 tons, or more, will be used aboveground in solid, close-jointed, and bedded, and externally and internally faced masonry.

Within a square of 40 feet, on an elevated solid foundation, three steps lead to a platform, or surrounding paved walk: the platform, the plinth, and the pedestal, are in outline, octagonal, four long and four shorter sides, or corners, cut off. At the top of the plinth the longer sides are about four times the length of the shorter.

From the platform to the entrance-doorway are the next three steps in the ascent. The plan of the interior of the pedestal is circular—a cylindrical wall around stairs—a surrounding gallery for memorials, with deep recesses in the external walls, to four angle windows, and to the door, with corresponding panel sinkings between these windows and opposite to these parts. In one, fronting the door, is the approach, with another three steps ascending to the iron stairs leading to the top. This gallery space has a superficial area of floor of about 250 feet, an extreme height of nearly 15 feet, and about 1,500 feet superficial of wall surface.

This gallery is lighted by eight windows,—four at the angles already noticed, and four circular windows near the top of the principal sides. In these last will be stained glass, which is prepared with family arms in centre of each,—a window being thus on each side of the external octagon.

Above this gallery externally, towards the upper part of the cap of the pedestal, which covers it, and all other horizontal sections, are circles.

The iron stairs are spiral, winding around a hollow centre or newel, within which the plummet is suspended, and all the work is adjusted from this one central and vertical right line.

As the work advances, the iron steps are hooked on to the newel tube, fastened together by screws with nuts through the brackets, and then fixed to the tube.

When complete, a spiral string of double iron brackets at the outer end of the steps will be united, and extend from foot to head, when, at both ends, it will be fixed to the floors.

An open space of 3 inches to admit light from top to bottom (a tube of light) separates the iron steps from the surrounding stone-work. In this space each step will be connected with the wall by a solid glass ball, of 3 inches diameter, with projecting spindles to enter the stone, and for fixing in a socket on the iron steps.

These glass balls will cut off electrical connection between the iron and the stone, and they will also reflect a degree of light from the dome and from each other, at each step, sufficient to light the way around more than thirteen revolutions.

The cast-iron foot of the newel stands on a bed of thick gutta percha, as a non-conductor of electricity, let into the stone foundation; and at every joint of the newel-tubes and steps the same material is introduced for the same purpose, and to prevent any jarring of the iron.

Looking to the exterior, the plinth of the pedestal stands within a square of 26 feet (the corner, as explained, being cut off), except on each side of the door, where it projects, and forms curves and splayed blocks at the ends of the steps, 2 feet 6 inches high, on which are to be placed spheres, cut to show an intersection with cones of 90 degrees apex angle, exhibiting more than twenty distinctly different curves, the "*cardioid*" (heart form) being prominent.

The plinth commences at the surface of the surrounding paved platform, and has one bold hollow, varying each way from a quickest point of curvature to points perfectly flat. This, in different ways, is related to plane and curved intersections of the cylinder, the cone, and the sphere.

A particular form of this character of curve has been selected to shoot off the rain-water from the base, and to harmonise with the lines above.

Each principal front of the pedestal is a plane surface, battering or reclining towards the central axis of the pillar half an inch to each foot in height, each having the same form of outline.

The four angle faces are straight on all horizontal lines, but with carved elevations determined by "cuspidated cissoidal lines"* applied to the principal faces, thus making the eight angles of the pedestal of varying curvature to the height of more than 14 feet.

In the south front is the door, the architrave to which, in outline, is a new curve derived from the cone. This is cut out of one piece of marble.† Over this is one of the circular windows, the architrave to which is likewise cut out of one piece of marble. On the west, the north, and the east fronts are marble tablets of the same form of outline as the architrave of the doorway, with marble architraves to the circular windows above, all identically the same as the one in the south front.

The object of this memorial is explained on these tablets in English, Latin, and French. That in Latin has already appeared in the *Builder*.

The narrow sides of the pedestal face intermediately the cardinal points, and have in each a window, referred to in the description of the interior. The outline of the architrave, also of marble, is proportionably a long echinoidal or egg form, the upper end being of a sharper curvature than the lower, to harmonize with the curved angles of these faces.

The line was drawn full size for the mould by most simple regulated continuous motion, and belongs to a host in variety derivable from the cone, &c.

The mouldings of the architraves, &c. are parts of plane, or deduced from curved conic sections.

The cap of the pedestal is a portion of a frustum of an obtuse cone, only requiring to be seen to be obvious, parts being cut off by eight vertical planes parallel to each face of the pedestal, but projecting over, with drip hollow soffit and bed moulding under, each of these being a particular curve.

Thus the principal fronts of the pedestal are each surmounted by an arched hyperbola as a pediment, and the angular sides by delicate curves of the same character, showing the practical source and application of one of the plane conic sections.

On the cap of the pedestal stands the frustum of an *acute* cone, of 30 feet diameter, which forms with the cap of the pedestal the base of the column, whose shaft is 80 feet high, and the diameter at the top is 10 feet. The profile or entasis is a varying concave curve, formed by a cuspidated conchoidal line.

"Nicomedes," about 200 years before the Christian era, contrived an instrument for describing it. It is now discovered to be a projection of a curved section or intersection of a cone, related to the hyperbola, as the cissoid is to the parabola. The capital of the column has two principal features in the stonework, the neck or bed moulding being in profile the line of beauty,—the true Greek water-line: and the true Greek cymatium, is the upper member, which is exactly of the same length, and consists of the same variation of curvature as the bold hollow of the plinth moulding, although totally differing from it in appearance. The greatest diameter of the capital is 16 feet, the circumference being more than 50 feet. On the top of the cornice, around the outer edge, it is proposed to place a series of coloured glass cones. Upon the capital of the column will be about 4 feet of block stonework, around which the crystal enclosure will be *belted*, and thus be fixed without any part of the metal framework entering into the masonry. In short, the crystal enclosure will be held in its position by about fourteen tons of stone. A ball, 12 inches in diameter, at the foot of each of sixteen standard bars of the dome, rests on strong pieces of glass, embedded and fixed on the top of the capital of the column, to isolate it from the metal-work,—a cavity being formed outside the blocking-course for the half of each ball. The height outside the dome, to the top of the crown, is about 18 feet. The diameter of the *band* at the brow is full 5 feet, and the diameter at the top of the crown is more than 7 feet 6 inches, and the circumference 23 feet 6 inches. The termination of the leaves* of the crown are to be tipped with glass, as repellents, or nonconductors of electricity.

The curve of the profile of the dome is a curved conic section,† a reciprocal of the conchoids. Inside the dome the height will be about 12 feet 6 inches, and the diameter at the floor 10 feet; the floor being extended over the stairs when required. At a convenient height from the floor, a portion of the glass in each of the divisions of the dome is open, either for ventilation or for more distinctly observing any distant object, either by the naked

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* Systematic practical investigations were, there can now be no doubt, the means used by the ancient Greeks for their great discoveries and rapid advances in the knowledge of Geometry, and these became their guide to the most delicate perceptions and correct applications in works of art.

Proceeding by the same or similar methods, the rediscovery of the source and the laws of various results in geometry, and of the most peculiar and beautiful forms which the Greeks introduced in art, has been accomplished, which for two thousand years had been lost, was unknown to the ancient Romans, baffled Vitruvius and all who have followed him. "Hogarth" apparently having had the clearest conception that the ancient Greeks had a "key," "the analogy:" in other words, it may now be stated that practical geometry is the analogy of nature, every law and form in nature having its analogy in geometry.

Therefore, to make further discoveries, begin at the beginning, as the Greeks must have done, and keep the beginning, the foundation, constantly in view. Do not be deterred by "Professor Willis," who calls such attempts "presumption." Is he sure that the roads of science have been swept quite clean? And do the accumulated results at Cambridge contain all? If so, why has the professor not directed the architect, the engineer, and the artist to such simple practical principles in his works?

* "The *cissoid* is a curve invented (discovered?) by an ancient geometer and engineer, named *Diocles*." "This curve . . . . . is described very beautifully by means of Mr. Jopling's apparatus"—*Mathematics for Practical Men, by Olinthus Gregory, LL.D. First edition.* 1825.

The cissoid is now discovered to be derivable from a curved section of a cone, and most intimately related in all its varieties to the parabola.

† A slab, now at the British Museum, from "High Mound, Nimroud," is of similar form of outline, and so nearly of the same size as to be worthy of notice. This was not known until after the marble architrave and tablets in the pedestal were fixed, although it was formed and decorated 4,000 years before them. This line has two branches continuing in the same direction, between two parallel asymptotes, at a given distance from each other. There is a great variety in the family. A line may be taken so that a portion of it may be very near a semicircle, while the branches are as near as possible right lines; yet if continued indefinitely, they are in reality varying courses.

* The edge of the leaves of the crown is a portion of a spiral line obtained by the application of part of a circle to a conic surface.

† This flame form is derived from an intersection of a particular angled cone, with a sphere, and there is evidence of some ancient knowledge of this fact, handed down in Indian art: in a similar way, the Greeks have left on record in their works of art some of their knowledge of geometrical facts, not to be found in any of their writings come down to this time that have been translated.

eye or with the aid of a telescope. Ventilation will also be provided at the top of the dome. On one of the horizontal rings of the frame-work, at a convenient height, will be marked the degrees of the compass, and maps for reference, corresponding radii being drawn: the exact bearing of any object noticed being taken, its place may be traced out with facility on the maps.

Under the varying states of the atmosphere and the changing positions of the sun at rising and setting, it will of course be a considerable time before every particular spot within the circle of the horizon can be ascertained and seen in the most clear and interesting aspect of light and shade, and in collecting a history of noted places discoverable from so elevated a position.

The architect of the column is Mr. J. Jopling.*

GAS.

As a means of increasing the illuminative power of gaslight, as well as for other purposes, the celebrated chemist Boussingault proposes the use of oxygen, acquired in large quantities by means of baryta, which at one temperature will attract oxygen from the air, and at another will yield it up again, pure and separated, of course, from the air, leaving the baryta ready as ever to attract more oxygen. Another mode of contributing oxygen to the gas is by the magneto-electric decomposition of water into hydrogen and oxygen, according to a patent about to be worked, we understand, by Mr. Shepherd, and a new "Electric Gas Company," and of which patent we long since spoke. The gases of the decomposed water, it is said, can be so managed that after being produced in abundance they can be burnt together without danger, so as to produce a fine light. In reference to the magneto-electric decomposition of water, and the use of oxygen in illumination, we may here note, by the way, that in a lecture on Boussingault's proposal, delivered at the Royal Institution lately, Professor Faraday remarked, as reported in the *Mining Journal*, that "the change oxygen undergoes in its conversion into ozone (that is, as many conceive it to be, when electrified), and the peculiar bleaching properties it acquires, have given rise to interesting speculations respecting the mode of action of that body, *and even thrown a doubt on its elementary character*." What will those writers now say, who imagined themselves so impregnably ensconced in chemical orthodoxy, when they ridiculed our anticipation, some years since, of this very result. Yet, so confident even then did we feel of the probability that oxygen was not an element, and might be decomposable,—as, for instance, by some peculiar form of magneto-electric apparatus,—into what Davy regarded as probably the only true element, namely, hydrogen, that the writer (J. E. D.) sent a copy of his remarks on the subject to Professor Faraday at the time, and now he has the satisfaction to find that the professor himself is advancing, experimentally and practically, along with his contemporaries, to the very same conclusion!——While on the subject of gas, we may here add, that a combined and economical apparatus for making ordinary gas on a small scale, for country mansions, hotels, farmsteadings, &c. has been patented by Mr. George Bower, of St. Neots. Mr. Bower writes us that he can now erect small gas-works for private houses, on this patent, for a very small sum.

* The following is a list of the lines which have names,—that have been, or are proposed to be, introduced in this work:—

1. Right line. } These need no reference.
2. Circle. }
3. Ellipse.—The perspective of circles and portions of this curve are introduced in mouldings.
4. Hyperbola.—The upper line of the vertical face of each pediment of the cap of the pedestal.
5. Parabola.
6. Conchoid.—Concave profile of the shaft of the column.
7. Cissoid.—Applied at the right angles of the elevation of the pedestal.
8. Cardioid.—This is now discovered to be related to the ellipse and the cone, as the cissoid and the conchoid are to that solid, and to the parabola and hyperbola.
9. Echinoid.—The outline of the architrave of the four angular windows.
10. Line of beauty.—The true Greek water-line applied as the profile of the bed moulding to the capital of the column.
11. Projections from a spiral, &c. applied as the base moulding to the plinth of the pedestal, and to the cymatium of the capital of the column.
12. Flame form.—Applied as an ornament on the belt of the crystal enclosure, to cover the stone work, by which it is held in its position.
13. Reciprocal of conchoid. Applied as the outline of the architrave of the door, of the tablets, and of the crystal enclosure—being described by a simple motion, and deducible from a curved conic section.
14. On each side of the entrance-door will be a number of curves—the source of the Greek honeysuckle and many other lines will be there apparent.

THE ROYAL CORNWALL POLYTECHNIC SOCIETY.

The twenty-first annual exhibition of this society commenced at Falmouth on Thursday in week before last, and is fully described and reported in the *Cornish Telegraph*. The opening took place in presence of a large and influential assemblage of people. The society this year, it appears, sustains its reputation in a majority of the numerous departments which it embraces. Besides various paintings, one of the more noticeable features of the exhibition consisted of numerous photographs and lithographs. In the body of the hall were specimens of serpentine, manufactured into chimney-pieces, vases, &c. Several prizes were given in the mechanical department for improvements. There were architectural and mechanical drawings—"Restoration of West Front of York Minster," G. Bellamy, Plymouth, first bronze metal, or 3*l.*; 40-inch condensing steam-engine, W. H. Truscott, St. Blazey, 1*l.*; architectural designs, W. Farley, Truro, 10s. In the fine-art department there was nothing very striking, and no report was read on the subject. In the naval architecture and natural history departments various objects were exhibited, as well as in fancy-work and school productions. Mr. Hunt delivered an extempore lecture "On Light;" and a commercial traveller, accidentally present, amused the spectators with an off-hand practical lecture on the various samples in glass contained in his portmanteau. In the evening Mr. Hunt lectured "On Photography;" and on Friday Mr. H. Mackworth, one of the Government mine-inspectors, gave "A Dissertation on Mine Ventilation." The hall was lit up with gas in the evening of Friday, and the public admitted. On Saturday models were explained and art-union prizes drawn. Amongst the articles exhibited were tables of white lime-wood, inlaid with specimens of sea-weed, by Miss Caroline Pearse, of Launceston, who expressed her wish, that, if approved, this sort of fancy-work should be made an occupation for decayed gentlewomen.

MUSEUM OF ORNAMENTAL ART, MARLBOROUGH HOUSE.

The Museum in connection with the Department of Practical Art has been enlarged during the recess, and is now again open to the public. A case of jewellery, of considerable interest, has been added, and several fine specimens of metal work. Amongst the bronzes will be found all those produced by the Art-Union of London, and which have been mainly instrumental in advancing this branch of art in England. The largest increase of specimens, as it seemed to us, is in the section illustrative of pottery, and a very interesting and instructive section it now is, including the collection of the late Mr. Bandinell. The case containing specimens of English earthenware is very curious, and would afford matter for an amusing paper. The collection of Majolica ware is large and valuable, and will be looked at with more wonder by the uninitiated, if they obtain a notion of the sums of money which such works fetch. And what is Majolica ware, some of our readers may ask? It is too long a story to go into now, but we may say, in brief, that the term probably had its origin in the fact, that painted pottery first came into Italy through the expedition against Majorca, in the twelfth century, when Moorish pottery formed part of the spoils. What we now know as Majolica ware proper belongs mainly to the fifteenth and sixteenth centuries. The earlier specimens of it are called mezza-Majolica. The finer ware was afterwards called "Porcellana," that being the Portuguese word for a cup. Majolica is sometimes termed Raffaelle ware, but improperly so. Raffaelle may have painted some of these pieces with his own hands, and it is quite certain that his compositions are found upon many of them; but still the best works in this manufacture were not produced till after his death. Oriental porcelain put its nose out of joint with collectors for a long time; but it is now taking its old top place. Specimens of the Chelsea china, too, we may say, will now bring very large prices. Both France and Germany had a Majolica of their own; but of this we will not speak, or we shall get into the long story we promised to avoid.

The funeral-car of the Duke of Wellington, furnished complete even to a coffin and the horses, is now open to inspection in the temporary building originally put up to receive it. The bronze work of the car has been greatly improved.

PREVENTION OF ACCIDENTS THROUGH RUINOUS BUILDINGS.

SECTION XI.

The condition of a considerable amount of house property is now become so deteriorated, and in such a state as to render it expedient to place before the public those points in which the Act fails to meet, with sufficient promptitude, the evils complained of. The difficulties the surveyor has to contend with are manifold: "litigated titles; the obstinacy, neglect, or poverty of the owners;" and last, but not least, some legal technicality, having no reference to the substantive merits of the proceedings, being raised by some barrister to defeat the case.

On all these points I have had experience. In many cases proceedings taken by me have been rendered entirely nugatory by the "overseers of parishes" having failed to give effect to my certificate of condemnation, and declining, under legal advice, to act as "authorised and required by the Act."

In some instances, owners live many hundreds of miles away; in other cases, cannot be found; and, again, in others, employ a barrister to defeat the proceedings, and get rid of their responsibilities; so that these may fairly be classed amongst the difficulties of the Act.

When the new Metropolitan Buildings Court comes into operation, it is to be hoped sufficient funds and summary jurisdiction will be given, and these onerous, and as I have shown in many cases, "impossible duties" taken out of the surveyor's hands. A District Surveyor.

THE LATE EXCAVATIONS AT THE ACROPOLIS, ATHENS.

Before the late works, conducted by M. Beulé, of the French Academy of Athens, the citadel which contains now the Parthenon had but one entrance, rudely built and hidden, as it were, in one of the lateral walls. Now the Acropolis possesses a majestic gate at the foot of the Propylæum, opposite the Pyræus and Salamis. The sight of the Acropolis has been much improved by the works of M. Beulé. A wall formerly built by the Turks, and which completely concealed the Propylæum, has been demolished, and thus the ancient wall has come to sight. It is of white (Pentelic) marble, decorated with frieze and cornice, and in an entire state of preservation, although the material has been somewhat altered by the lapse of so many centuries. Two massive structures are at the side of the door; and in the middle opens an Ionic gateway, which corresponds with the great portico of the Propylæum. It is from this spot that we may judge of the great plan of the monument of Mnesicles. The immense staircase, which reached up to the top of the Acropolis, had a width of 70 feet! of which the last stairs have been found. M. Beulé's official report concludes thus:—"Since the wall which concealed the western side of the Acropolis has been demolished, the Propylea have reappeared in all their old splendour; and we may view them without being obliged to go to the hills of the Museum or the Pnyx. From this road, which leads to the new entrance, we see their white columns and the grand trapezium of their door. A little terrace has been constructed by the French engineer, whence a fine view of the smaller portico of the Propylæum and the gilt door of the Pinacotheka may be obtained. Nearing the entrance, we perceive a façade in marble, which is an object of great curiosity. The side-buildings, of very regular proportions, form, as it were, a natural vestibule. Through the opening of the doorway we perceive the great staircase and the central gateway of the Propylæum,

and all the height of the scenery. Now only the whole plan of these splendid structures can be perfectly appreciated." The correspondence carried on between M. Beulé and the Greek Government, contains a full acknowledgment of the services thus rendered to architecture and art. A large marble table, erected at the entrance of the Acropolis, contains the following rather windy inscription:—"La France a découvert la porte de l'Acropole, les murs, les tours, et l'escalier. 1853. Beulé."

GELATINE MOULDS FOR CASTS.

A CORRESPONDENT asks the best method of using gelatine for elastic moulding. I have used it extensively, and find the following mode answer very well. Dry your *plaster* model thoroughly, and stop the suction with boiled oil: then lay a thickness of half an inch of clay entirely over the plaster, on which make a plaster case: when set, take it off, and remove the clay, which will leave a clear half-inch space between the case and the model. The advantage of this method is, you have a regular strength all over; no thick and *thin* places which are apt to break. Dry and oil your case the same as the model: make a hole in any convenient place, and pour in the gelatine, it being melted to about the thickness of carpenter's glue. It will take about twelve hours to get hard. To get a cast from the mould, first oil it in the usual way, and fill in the plaster: you must take the cast out of the mould before the plaster is sufficiently set to become hot, or it will take the face off the mould. You may take out six casts in an hour.

W. C. R.

ANTWERP.

AT the Antwerp Bourse, the design for which we published some time ago, M. Charles Marcelles has erected the entire of the iron-work to cover the area, and the glazing is nearly completed. The effect is very satisfactory, according to our correspondent, and the building itself appears much improved by the iron window-dressings to the range of windows over the arcades. At the cathedral, M. Durlet has finished the stalls, and has since resigned his appointment as architect. In the tympanum over the entrance between the towers in the transepts, M. Bellemans has painted religious subjects on gold ground. Much fault is found with their excessive gaudiness in relation to the dark grey stone of the framework, and it is proposed either to dirt them down into harmony, or to repaint them more soberly.

THE CONSTRUCTION OF ROADS.

AN article having appeared under the above head in the *Builder* recently, will you permit me to offer a few remarks thereon?

The construction of roadways in the larger public thoroughfares of the metropolis has occupied much attention for some years, but very little has been done towards their effectual improvement, nor can we expect (as your correspondent of last week justly observes), to have good roads while the foundations are repeatedly disturbed by gas and water companies. You may ram and concrete, but all to no purpose. Neither wood blocks, Macadam, nor granite paving can stand, unless an unyielding foundation can be obtained; nor would the plan proposed by your correspondent meet any better fate, unless the whole of the pipes were taken up and differently arranged and the sewerage reconstructed. This would be a work of considerable labour and expense. The idea of building walls longitudinally (although piers would seem to answer the purpose) might be carried out with advantage, without the addition of underground roadways; and I would suggest that the pipes should be placed as near the footpath as practicable. The outer wall, or piers, built in cement, should be constructed so as to form supports for the pipes on each side the road. The earth from below and around to a certain extent might be excavated, and access afforded to get at the pipes. Outlets might be formed into the common sewer, to carry off any overflow from the defective pipes, and provision made to flush the sewers by these means. Iron manholes could be provided at stated distances. The intervening space of roadway would then have two or more walls running longitudinally, and should be built battening on each side upon solid foundations. Common centering might then be inserted, and blocks of granite, joggled on both sides, pinned in upon the principal of the arch. This would, I doubt not, form an unyielding mass. The upper course of each wall should be grooved.

JOHN EDWARD REID.

IMPORTANT TO BUILDING SOCIETIES.

IN the City Small Debts Court, Guildhall, an action was recently brought against a trustee of "The Second Tower-street Building Society," of some importance to building societies. It appeared that the plaintiff, Christmas, as a member of the above-named society, had contributed the sum of 23*l.* and that, with interest thereon, he sought to recover of the defendant, Sandman, who was a trustee of the society. Robinson, the secretary of the society, had become defaulter, and the society itself was insolvent. Under these circumstances Mr. Sleigh, counsel, contended that the defendant was clearly liable for the amount of all subscriptions paid into the society. The defendant's solicitor, on the other hand, contended that under the Friendly Societies' Act and the rules of the society, arbitration was the legal course for the plaintiff to have recourse to. That if held, contrà, he urged that the action must fail, as the responsibility of trustees only extended to moneys actually received by them, unless they signed a declaration in writing, consenting to be personally answerable for the funds of the society; and no such declaration had been signed by the defendant.

In answer to this, Mr. Sleigh said he was prepared to prove that the defendant had actually received moneys, and examined the defendant to prove the receipt of subscriptions. Mr. Sandman stated that he had been a trustee of the society. There was a banking account kept in the name of the trustees, but he had never actually received any moneys belonging to the society.

His Honour said, after this evidence he was of opinion that the action could not be maintained; and nonsuited the plaintiff, with costs.

Miscellanea.

STATE OF THE RIVER SHORE AT BERMONDSEY.—One of the working-classes, "A Constant Reader," writes us complaining sadly of the abominable filth which the Sewers Commissioners, he says, have managed to bring from all quarters on the south side and cast out upon the open shore, in face of the poor inhabitants who live on its borders. The dirty habits of some of the lower orders, he continues, are much expatiated on by gentlemen of the class to whom Sewers Commissioners belong; but this is a shocking example, he thinks, to set before them,—little better, he remarks, comparing great evils with small, than it would be were some of the poor people of Bermondsey habitually to empty the contents of all filthy utensils into their water-butts or cisterns, but which poor people are not yet so dirty as to do, even though instigated to it by such an example. Sewers Commissioners, he says, have no conception of the bad odour in which they are held by all those poor people who have to hold their noses whenever they come within sniff-shot of some of the "works" of said commissioners on the Bermondsey shore. In fact, he seems to be quite ashamed of them himself. Now raillery such as this may be offensive, but there is truth in it as well as pungency, such as it is; and we do believe that as little allowance is often made for obstacles in the way of cleanliness amongst the poor as is here shown for difficulties in the way of cleanly habits amongst Sewers Commissioners. Our correspondent thinks it would be more reasonable were the sewage to be taken *to* the country districts of Peckham-rye, &c. to manure the land, instead of *from* it to pollute the metropolis and its river. He looks upon the filth that is strewed along the shore from the sewer-mouths as just so much cholera-seed which the Sewers Commissioners are ever sowing, and looks forward to the advent of cholera there as certain, were it on this account alone.

CONSECRATION OF A COLONIAL CATHEDRAL.—The Consecration of Christ Church, the Cathedral of the Diocese of Fredericton, New Brunswick, took place on the 31st of August. The ceremony was attended by a large assemblage of bishops, clergy, and laity of the Diocese, and from Nova Scotia, and the United States. The collection after sermon amounted to upwards of 250*l.* the largest collection made, it is believed, at any one time in British North America.

HOGARTH'S PICTURES IN BRISTOL.—The vestry of St. Mary Redcliff, Bristol, have announced for sale the three pictures in their church, painted by Hogarth,—the "Ascension," the "Sealing of the Sepulchre," and the "Two Marys at the Sepulchre," desiring to apply the value of these works, which are not suited to the church, towards the cost of fitting up the sacred building with new oak seats, pulpit, font, and screens.

IMPROVED WHEELBARROWS.—At the meeting of the British Association, at Hull, Capt. Wilson called attention to a newly-constructed wheelbarrow, which would enable the labourer to perform double the amount of work, as, by the alterations, the barrow was capable of holding twice as much, and required no more exertion to wheel than that at present in use. The best-constructed barrow for certain purposes, was the washerwoman's wheelbarrow, which had a stage raised over the wheel for the linen-basket. The present example was the more complete, carrying out fully that idea. The first difference of the new barrow from the one in use was, that the wheel was sunk into the floor of the barrow, thus throwing a great portion of the weight on the top of the wheel, instead of its being, as previously, between the hand and the wheel, and by this alteration they could double the quantity of the load. The floor of the barrow was broader at the handle than at the wheel, as by increasing the balance and pressure on the hand, to counterbalance the weight beyond the fulcrum, they thus extinguished the oscillation. The handles were a separate joint from the framework of the barrow, and were raised, so as to decrease the first lift as much as possible, and by this arrangement they brought the weight below them, and caused a horizontal pressure instead of at an angle of 30 to 35: they thus had a fair forward movement, instead of the wheel being pressed into the ground. A brass pin was placed in the tip of the hand-board, directly in a line with the wheel, so that it would serve as a guide to the labourer when he required accuracy in his work.

PUBLIC WORKS IN EGYPT.—Mr. Stephenson, on the subject of the railway now in progress of construction in Egypt, says,—"His experience in Egypt surprised him not a little. During the construction of a railway there, he calculated on much difficulty with regard to the making of embankments, ditches, culverts, and so on. But arrangements were made through the agency of dragomen and the Egyptians. He was almost in despair at first, but after they had become familiar with the labour, they performed a quantity of work that was really astonishing. He mentioned this circumstance as one that stood in strong contrast to the Britannia-bridge masonry, which might be regarded as a work where the utmost available amount of science was brought to bear, while the Egyptians' work was one in which an indefinite division of labour was employed and exemplified. An embankment was made over the delta of the Nile, extending to about 140 miles, 8 feet high, and 25 feet wide: the whole, he believed, was now completed within about eighteen months. One portion of the work struck him as very remarkable. The Pasha of Egypt had, of course, the power of sending to villages, and directing the people to cause a certain amount of work to be performed in a certain period. A road was required to one of the Pasha's palaces, and the Pasha ordered it to be made. To be ordered there is to be done. The road was made thirty miles long, 40 feet wide, and 8 feet high; and in what time could it be supposed? Why, in six weeks. In that comparatively barbarous country, then, a work had been accomplished which he had not known equalled in any country however highly civilized."

GLASS.—In the glass trade there is a brisk demand, prices rather advancing than declining. At the works of Messrs. Chance, West Bromwich, and at the furnaces of the Birmingham Plate Glass Company, the hands are at full work; and Messrs. Summerfield and Lloyd have also materially increased their trade. This firm has lately been maturing a new application of glass to external purposes of shop decoration. They are preparing sash bars in flint glass, for shop fronts, large windows, &c. The bars are moulded in several lengths, held together by steel rods, running through the centre, and enclosed in the fluted glass tubes. The objects aimed at are novelty of appearance, increase of light, and facility of cleaning. Great strength and durability are also said to be thus attained.——The glass wall enclosures, invented, it is said, by Mr. Ewing, of Bodogan, Anglesea, have been put to use during the past summer, and are reported to have protected fruit trees and ripened the fruit in a very satisfactory way. Even figs are said to have ripened well during the present cold and wet autumn.

WHITE LEAD.—It is calculated that the use and manufacture of every thousand tons of white lead produce, on an average, a hundred and twenty patients and five deaths.

NEW MARKET-PLACE BUILDINGS AT ARBROATH.—The town council of Arbroath having resolved to lay out 2,000*l.* on a design for the formation of new market buildings, estimates were called for, but the first tender for the design amounted to 5,000*l.* and after reduction it is still 3,600*l.* or 1,600*l.* beyond the specified outlay. According to the local *Guide*, however, the council committee have resolved to recommend the council to carry out the plan as modified.

UNDERMINING SUNDERLAND-BRIDGE.—The great bridge across the navigation at Sunderland, it is said, has been in imminent peril, if not seriously injured, by the blasting of the adjoining rock, which is reported to have actually laid bare the very foundations of the bridge, so that it was rumoured at first that the bridge had been blown up. How the corporation could permit blasting to proceed to such an extremity at such a spot cannot easily be imagined. If they have had no power over the property so closely adjoining, there must have been some strange oversight from the beginning. Mr. T. Meik, C.E. and other engineers, assisted by Mr. Moore, the architect of the bridge, according to the *Newcastle Journal*, have since been engaged on a survey, with a view to the adoption of such measures as they might deem requisite for the safety of the structure.

DESTRUCTION OF CARPENTERS' PREMISES, AND WORKMEN'S TOOLS.—It appears from an advertisement in our columns this week, that a subscription is in progress in aid of two carpenters and their workmen at St. John's-wood, who have been deprived of tools and other property, valued at upwards of 800*l.* by a fire in their premises, the origin of which, it seems, remains a mystery. From the respectability and number of those who have already subscribed, we have no doubt the case is one worthy of the helping hand of those who can contribute towards the replacing of the poor men's property. At the same time we would wish to put in a word in favour of insurance amongst carpenters and their workmen above most men, from the liability of their property to be burnt. The insurance of a workman's tools would cost but a trifle per annum.

SHOCKING ACCIDENT AT PRESTON.—On Monday last between 200 and 300 turn-out factory hands, chiefly young women, were collected into a room 25 feet by 20, at the Corporation Arms Public-house, in Preston, when the one beam in the centre which sustained the floor gave way, and precipitated the whole crowd into a room 12 feet in height below. Fractures of rib, leg, and other bones innumerable were the consequence, and one poor girl, fourteen years of age, was killed on the spot. In a public-house especially, but indeed in any place where it is even barely possible that a crowd of people may collect, it is culpable to construct a floor incapable of sustaining the weight of all the human beings who could possibly find standing room in it. In the present instance, it is said, the floor went down like a pair of folding trap-doors, when the single beam snapped in the middle.

THE BELFAST TESTIMONIAL.—The committee of management for the erection of a monument to the late Earl of Belfast, in his native town of Belfast, have decided that McDowell, R.A. shall execute the statue resolved upon, and which is to be cast in bronze. It is believed that 1,500*l.* will suffice to carry out the intended monument, and we are pleased to hear from Belfast that it promises to lead to other objects of street ornamentation, of which we may be able soon to speak more fully.

ART-EDUCATION FOR SCHOOLS.—An aggregate meeting of teachers of elementary schools in the metropolis was held in Shaftesbury-hall, Aldersgate-street, on Saturday in last week, for the purpose of adopting resolutions for effectually introducing the rudiments of art and science into elementary schools. Upwards of 150 teachers of both sexes were present, and in the absence of the Lord Mayor, from illness, Mr. Burchett, head master of the Marlborough-house-school, presided, and addressed the meeting, after which a report of preliminary procedure was read, and resolutions to the following effect were passed,—namely, that elementary school teachers should have the means afforded to them of becoming practically acquainted with the plans proposed by the Department of Practical Art; that the meeting appreciated very highly the announcement that classes would be opened by the Department of Practical Art for giving instruction to teachers, and would take the liberty of suggesting, as necessary to success, that the evenings for giving such instruction should be, for one course, Monday and Thursday, and another course on Tuesday and Friday, and that a class for schoolmistresses be established on future arrangements to be made; and lastly, that the meeting was sensible that a great number of teachers would avail themselves of the advantages of the lectures at Marlborough House, but whose time is so absorbed by their duties as to make their attendance quite impossible, and that it was, therefore, of urgent necessity that classes should be formed in the centre of the City, and, if possible, connected with a museum of objects of interest to teachers of elementary schools, and especially in reference to science and art. A committee of three was then appointed to carry out the preceding resolutions, and superintend the arrangements to be adopted for establishing an educational museum in the metropolis.

THE IRON TRADE.—At the first of the quarterly meetings of this trade, it was discreetly resolved not to raise the nominal price, although strenuous endeavours had been made to induce the masters to do so. It appears, however, that the real reason of this comparative moderation, was the fear that a rise in wages would be forthwith demanded by the workmen connected with the trade if the masters declared an advance in price.——The Dowlais works are now in activity again. They do not, however, as yet contain more than 300 men at work, whereas the force that struck for the advance was fully 1,200. The others have gained employment elsewhere. A number of the best men have emigrated to Australia; and so great has been the emigration from Merthyr that it exceeds the influx by 30 per cent. The ironmasters cannot depend upon an Irish supply, as the natives of the sister isle prefer America or Australia, and labour is scarce in all the Welsh markets. The works at Dowlais have been put into a state of thorough repair, new brickyards having been erected.——Mr. G. Mackay, of Buckingham-street, Strand, has patented a method of decarbonizing iron ore after it has been through the process of deoxidation, and thereby of reducing it at once from the ore to malleable iron. *Claim*—Forcing down upon the iron ore, from the roof of the furnace, in the different stages of the process, as required, and on the different hearths, atmospheric air, either heated or cold, for the purpose of decarbonizing the ore, and bringing the iron to nature, or refining the same, and regulating the degree of heat in a peculiar manner described.

INNS OF COURT *versus* THOROUGHFARES.—We have heard of coaches-and-six being driven right through certain Acts of Parliament; but our lawyers take very good care that even cabs-and-one do not drive through Inns of Court. Now that Fleet-street is being repaved, these Inns of Court become a serious inconvenience, as "Nobody" remarks, for they compel everybody but pedestrians to wheel round all the way by Holborn, on their way to or from the City, or between the Strand and Cheapside, doubling or trebling the route by cab and omnibus. In fact, these Inns,—the Temple, New Inn, Clement's Inn, Serjeant's Inn, Clifford's Inn, Lincoln's Inn, and Gray's Inn,—almost cut the metropolis into two parts.

BALMORAL.—The chief stone of the great tower of the new Highland Home of the Royal family now in course of erection at Balmoral was laid by her Majesty on Thursday in last week with the usual formalities, assisted by Mr. Smith, of Aberdeen, the architect, and Mr. Stuart, of Peterhead, the builder; and the workmen, with their wives and families, were afterwards entertained at her Majesty's desire and cost in the iron hall-room at Balmoral.

FALL OF A RAILWAY BRIDGE.—Last week a bridge, about half a mile from Dorchester, and recently constructed across the turnpike-road over the Wilts, Somerset, and Weymouth Railway, fell while the workmen were engaged in completing the excavations beneath it, although the parapet wall was taken down to relieve the structure of its own superincumbent weight. But for timely warning, at least twenty men must have lost their lives. There would appear to be a fatality about this bridge, since this it seems is the second time it may be said to have been built up; for, about six months ago, we are told, it had almost arrived at completion, when it was declared by a competent authority that it would "never stand." It was therefore taken to pieces and the foundations laid afresh, with what result has just appeared.

THE BRICK TRADE IN LIVERPOOL.—The quantity of common bricks made in the vicinity of Liverpool, according to the local *Times*, varies from 30,000,000 to 40,000,000 per annum, according to the ratio of house building, &c. There are twenty-four master brickmakers and forty master bricklayers.

ODD TENDERS.—The following particulars of tenders for wire fencing round the reservoir at Southampton (400 yards), were in the *Hants Independent* of last week:—

Matthew Parker	£600	0	0
Kent and Dain	450	0	0
C. Walker and Co.	445	0	0
Summers and Co.	445	0	0
J. Rowland	383	10	0
J. and C. Godden	367	10	0
Saunders and Gollop	240	0	0

AT Llanelly, Carmarthenshire, tenders for the construction of a reservoir were received on the 15th inst. of which the following is a list:—

Douglas, Llanelly	£6,315	0	0
Warren and Denroche, Cardiff	4,940	0	0
James and Price, Cardiff	4,890	0	0
Griffiths, Swansea	4,703	0	0
Lewis, Carmarthen	3,941	0	0
Frith and Beard, Swansea	3,689	0	0
Hughes, Swansea	3,505	0	0

Mr. Lewis's tender was accepted, but he ultimately backed out, and a correspondent informs us that the managers intend having fresh tenders.

HEATED AIR AS A MOTIVE-POWER.—Mr. A. O. Willcox, of Philadelphia, has recently taken out two patents for improvements in atmospheric engines. He employs "interchanging circulators," placed within and occupying one-half of the capacity of each heat-reversing vessel, alternately transferring the air to the heating and cooling divisions; the same movement causing the air to pass through renovating plates placed outside the circulators. The plates or economising discs are attached to the driving piston itself, by which means the patentee states he is enabled to effect the complete rarefaction of the heated air while the piston is descending, and before the cold air is again let into the cylinder.

PREVENTION OF ACCIDENTS IN MINES FROM ROPES BREAKING.—Mr. C. Butterclough, a Flintshire magistrate, presents the public, through the *Mining Journal*, with a simple invention for staying the descent of the bucket or cage, in case of fracture of the rope or chain. Two strong bars of timber, longer than the diameter of the shaft, are placed in the form of a St. Andrew's cross, freely moving on a strong centre iron pin, and two strong vertical springs, either of steel or thick India-rubber, keep them in place: the bucket is suspended to the two upper ends of the cross by ropes, or chains, passing through rings, or slots, in the lower end of the bars. In case of the rope breaking, the springs, aided by the weight of the bucket, cause the bars to open, and wedge themselves against the sides of the pit, preventing the fall of the bucket.

A NEW PRINCIPLE IN NAVAL ARCHITECTURE.—A pamphlet has been published by Wilson, of Leadenhall-street, on what is called the diagonal principle of planking ships, invented and patented in 1818 by William Annesley. This principle, which consists simply in forming the hull with several courses of planking crossing each other at various angles, and dispensing with frame timbers or ribs, is said to be far stronger than the usual principle of planking, and more preservative of the main body of the vessel from damp, rot, &c. Several vessels were built on the new principle about the time of its invention, and are said to have survived all the usual certified classifications. Might not some such principle be combined with the use of iron, and with the cellular or tubular principle also, so as to obtain a result superior to any one of them in strength and safety? We do not see why ships might not be so knit together, and with such buoyancy and impenetrability, that sinking or wreck would be next to an impossibility, in spite of storms, rocks, or shoals.

FUNDS FOR THE NEW CATTLE MARKET IN COPENHAGEN-FIELDS.—The Markets Improvement Committee have borrowed 50,000*l.* for seven years at 4 per cent. per annum from the London Life Assurance Company, and have entered into contract for the execution of the works to the extent of upwards of 40,000*l.*

TENDERS

For building three third-rate houses at Anerley; Mr. W. Matthews, surveyor:—

Parry and Son	£1,640	0	0
Mr. Brewer	1,560	0	0
Rowland and Evans	1,420	0	0

For National Schools, Ragged Schools, and residences, at Hitchen, Hertfordshire; Mr. J. H. Hakewell, architect:—

Hawke (London)	£3,961	0	0
Clever (London)	3,853	0	0
Cushing (Elmham, Norfolk)	3,800	0	0
Gilder (Hitchen)	3,651	0	0
Butterfield (Hitchen)	3,316	0	0

For the St. Pancras Cemetery, at Finchley; Messrs. Barnett and Birch, architects:—

	Episcopal Chapel.	Dissenters' Chapel.	Piers.
Rowland and Evans	£3,510	£1,798	£617
I'Anson	3,450	1,500	360
Myers	3.336	1,473	436
Locke and Nesham	3,320	1,494	336
Hayward	3,075	1,210	270
Glenn	2,487	1,167	312

TO CORRESPONDENTS.

"W. R. C." (we are forced to decline), "J. H. C." "R. C. C." "E. W. M." (under our mark), "B. P." (ditto), "A. C." "J. J." "E. W. W." "W. D." (we are unable to assist), "M." (ditto), "J. D. P." (the efficacy of chloride of lime is well known), "C. G." "G. L. P." "Inquirer" (any months to suit local convenience, except November, December, January, and February), "Query" (the objection is not quite sound), "W. P." "Reader," "C. M. W." "A Constant Reader" (if we mistake not, the following are the five places referred to, namely, Manchester, Salford, Doncaster, Carlisle, and Stockport), "J. N." (we will visit them), "C. J. L." "A Brick," "Mr. R." "P. M. H." "J. F." (the Archæological Association meet in Sackville-street; the Archæological Institute in Suffolk-street), "J. S." (shall appear), "S. R. R." (ditto), "S." (thanks).

NOTICE.—All communications respecting *advertisements* should be addressed to the "Publisher," and not to the "Editor:" all other communications should be addressed to the EDITOR, and not to the Publisher.

"*Books and Addresses.*"—We have not time to point out books or find addresses.